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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the connector designed so that the printed circuit board which has a conductive metal strip might be held on the field where the 1st and the 2nd counter. A connector Have the body designed so that it might be attached on said substrate, and said body contains housing for holding a microphone module. Holding in said hold housing partially further at least has the microphone module meant. Said microphone module has a microphone. In one side [further] 1st at least one conductive element which has an area for electrical installation with the conductive element of a complementary corresponding connector, and has an area for contact to the metal strip which is on said 1st field of a substrate on the other hand, On the other hand, it has an area for electrical installation with said microphone, and has 2nd at least one conductive element which has an area for contact to the metal strip on a substrate.

[0002]

[Background of the Invention] Such a connector especially is used for mobile communication devices, such as a cellular phone. Data transfer is performed or they transmit electrical energy through the suitable connector for the equipment which was incorporated everlasting, for example, was combined with the external unit from the source of electrical energy using external information processing units, such as a microcomputer.

[0003] Such a connector also makes it possible to make electrical installation between the microphone in a mobile communication device, and the latter printed circuit board again.

[0004] It is a cellular phone containing this type of connector, and the thing which a microphone is arranged next to the group of a contact terminal, and enabled it to connect the member of an auxiliary device there is indicated by bibliography US-A -5,761,299 and US-A -5,836,790.

[0005] Therefore, the group of a microphone and a terminal aligns along the longitudinal direction of telephone, i.e., the width of face of telephone. More, in accuracy, along with the width of face of the printed circuit board of telephone, the group and microphone of a contact terminal are located in a line, and are arranged, and this substrate extends along with the great portion of die length of a cellular phone. Furthermore, the group and microphone of a connection terminal are arranged at the side with the same printed circuit board.

[0006] A consumer's need is asking for the dimension of a cellular phone being small as much as possible by the end of today. However, since the microphone formed next to the group of a connection terminal into a connector exists, the longitudinal direction lower limit will be restricted at the pars basilaris ossis occipitalis of telephone, the field, i.e., the general target, for which the connector of a portable telephone is prepared.

[0007]

[Summary of the Invention] The purpose of this invention is proposing the connector which could use it with the portable telephone and reduced the dimension.

[0008] That the theme of this invention holds the printed circuit board which has a conductive metal strip on the 1st of an above-mentioned type and the 2nd opposed face is the connector meant because of this purpose. Said body has the space for holding said substrate, and said space is specified between the electrical installation areas of the 1st and 2nd conductive elements. The 2nd the metal strip of a conductive element which the contact area of ***** has on said 2nd field of a substrate again and machine target of ***** are contacted again. thereby -- the -- a microphone module It is characterized by the thing [essentially being arranged to the it side as the

contact area of ***** of the 2nd conductive element of ***** same again again] to said space for holding a substrate.

[0009] When a specific example is followed, a connector has one or the description beyond it among the following descriptions. Namely, said microphone module At least, partially, it is arranged along said space for holding a substrate, and said hold housing is arranged in said body. By that cause said hold housing if said substrate is inserted in said connector -- the 2nd field of a substrate -- essential -- facing -- extending -- the -- again -- the 1st conductive element of ***** -- the -- the electrical installation area of ***** again It is arranged succeeding said space for holding a substrate in said body. The 2nd conductive element which is ***** again is united with said microphone module. Said body have a path for the 2nd conductive element of ***** again, and housing for said path to hold [the] a microphone module It connects with said space for holding a substrate. Said body and said microphone module It has a complementary means for holding said microphone module in the location where it was beforehand set in said hold housing. Said complementary means for holding a microphone module in the location defined beforehand It has a means for engaging said microphone module with said hold housing flexibly. Said microphone module It has at least one casing containing at least one channel for guiding the acoustic wave which held said microphone and was turned to said microphone.

[0010] Another theme of this invention is a mobile communication device. It At least one casing, It has at least one printed circuit board and at least one above-mentioned connector. Said substrate to said connector spigot rareness and said casing It has the access opening of the 1st conductive element which is ***** again which countered with the electrical installation area of ***** again, and was prepared. Thereby, one or each conductive element of a complementary connector is characterized by the thing of the 1st conductive element or the 1st conductive element of said connector combined with some at least.

[0011] Mobile equipment is a cellular phone when a specific example is followed. This invention is given for the purpose of only instantiation, and if explanation of the following created with reference to a drawing is read, it will be understood better.

[0012]

[Detailed Description of the Invention] Drawing 1 shows the connector 10 according to this invention inserted in the portable telephone 12. A portable telephone has the printed circuit board 14 held between the back half shell 16 and the front half shell 18. Two half shell 16 and 18 appoints the range of casing of the outside where telephone extended. The die length of a printed circuit board extends along with the die length of telephone. A keypad is prepared on the front half shell 18.

[0013] A connector 10 is formed in the lower part edge which counters the direction which has, the pars basilaris ossis occipitalis, i.e., the sound propagation component, of telephone 12. For this purpose, the front and back half shell have Discontinuity 16A and 18A, and the path for accessing a connector among them is specified. This path is formed in the lower part end face of casing.

[0014] Opening 19 is made by the pars basilaris ossis occipitalis of the front half shell 18 so that an acoustic wave may pass in the microphone of telephone.

[0015] A connector 10 has the body 20 designed so that it might be attached in the lower part edge on a printed circuit board 14. A connector 10 also has the microphone module 22 designed so that it might hold in the housing 24 of a body. This module faces opening 19 and is positioned.

[0016] As shown in drawing 2 , a body 20 has the slot 26 for holding the edge of a substrate 14. By this slot 26, a connector can include the edge of a substrate 14 along with that width of face. A slot 26 is designed so that the range can be appointed with the covering wall 30 which extends in parallel with the base 28 and the base 28 which were meant so that rear-face 14A of a substrate might be contacted and it may be pushed against front 14B of a substrate.

[0017] The base 28 and the covering wall 30 of each other are connected by the end wall 31 designed so that it might extend in a longitudinal direction at the edge of a substrate 14. This end wall stops a slot 26 partially by extending perpendicularly to the base 28 and the covering wall 30.

[0018] Furthermore, a slot 26 can appoint the range of a side face with the column 32 which connects the base 28 to the covering wall 30. In order to let these columns pass, a printed circuit board 14 is equipped with notch 32A opened along with the lower part edge.

[0019] An end wall 31 has 1 set of housing 33 (see drawing 3) which extends in parallel mutually. Each housing 33 is contained in the base 28. These housing 33 is arranged along with the great portion of die length of an end wall 31.

[0020] Each of these housing 33 contains the conductive element 34 which is looked at by drawing 3 . Each conductive element 34 consists of an elastic metal blade. These conductive elements 34 follow the parallel slot 36 (drawing 2) made from the inside on the field of the base 28 which appoints the range of a slot 26. Each edge of a conductive element 34 is held in the corresponding slot 36, and it is designed so that it may interact with the conductive metal strip 38 prepared on rear-face 14A of a printed circuit board 14. These metal strips 38 are continuation of the truck on a substrate.

[0021] Each opposite edge of a conductive element 34 forms the electrical connection terminal for terminals which was designed so that electrical installation with another external member of equipment might be brought about and with which a complementary connector corresponds.

[0022] The base 28 follows both sides in a longitudinal direction with a fixed tab 40 so that drawing 2 may see. The opening 42 including at least one **** for immobilization which brings about the path of the system for immobilization in a substrate is formed in each of a fixed tab 40.

[0023] the housing 24 for holding a microphone module which is looked at by drawing 1 and drawing 2 faces the conductive element 34 attached in the base 28, and is formed -- having -- a connector -- it exists in a central field mostly. If another example is followed, the hold housing 24 will be formed in the field near [one] the outside edge 43 of the longitudinal direction of a connector 10. The hold housing 24 is formed in the side which the base 28 counters to a slot 26. It is partially produced in the covering wall 30.

[0024] Generally the hold housing 24 is a cylindrical configuration. The shaft extends to the field and perpendicular direction of a slot 26. The hold housing 24 can set the range to accuracy with the wall 50 of a semicircle pilaster made by the covering wall 30 more. The wall 50 of this semicircle pilaster follows the skirt board 52 of the semicircle pilaster which is the part which others of a body unified. The skirt board 52 and wall 50 of a semicircle pilaster specify the cylindrical space which especially opens at both ends and is opened in a slot 26.

[0025] The height of a skirt board 52 is larger than the thickness of the covering wall 30. The skirt board 52 of a semicircle pilaster follows the tab 58 for holding the microphone module 22 to a tangential direction at the two edges. These tabs 58 have the projection 60 turned to the end wall 31. These projections extend on the covering wall 30, and appoint the range of the notch 62 for holding the complementary tabbing component which is on the microphone module 22 with this wall.

[0026] Furthermore, opening 64 is made by the medial surface of the skirt board 52 of a semicircle pilaster, and enables engagement with the flexible microphone module 22 to be held.

[0027] The microphone module 22 is shown in a detail at drawing 3 and drawing 4 . This microphone module 22 has the microphone 70 held in casing 72. This casing has the body 74 which specifies housing for holding the covering 76 for stopping a microphone 70 and a body.

[0028] Inside, a body 74 appoints the range of the opening 76 of the cylindrical shape holding a microphone. This opening follows the channel 78 for guiding an acoustic wave and routing them to a microphone 70. A channel 78 is opened to a longitudinal direction as opening 80 in respect of casing.

[0029] As generally as the configuration of the hold housing 24, the configuration of the lateral surface of the body of the microphone module 22 is complementary. Therefore, it essentially has the cylindrical lateral surface. The extension 81 of the direction of a path in which a channel 78 and opening 80 are formed projects from the field of this cylindrical shape at the one side edge of a body.

[0030] In the field of the longitudinal direction, a body 74 has every one projections [two] 83 at each extension 81 side of the projection 82 designed so that opening 64 might hold, and the direction of a path. Projection 83 is designed so that it may hold in the notch 62 of a connector body. Therefore, a notch 62 and opening 64 interact with projection 83 and projection 82, respectively, and, thereby, the microphone module 22 may be held in a desired location.

[0031] Covering 76 has the configuration of a circle substrate mostly, has the collar 84 designed so that it might interact with the slot 86 of the hoop direction prepared around it at opening of a body 74, and fixes covering 76 to the one side edge of a body 74 by flexible engagement.

[0032] Furthermore, two conductive elements 88 intersect covering 76, and bring about electrical installation between a microphone 70 and a printed circuit board 14. These conductive elements 88 are formed of an elastic blade, and the branch 90 of one of these projects on the outside of the microphone module 22. The free end of a branch 90 is bent.

[0033] As shown in drawing 3 , a branch 90 is designed so that it may interact with the metal strips 92 and 94 directly prepared on front 14B of a printed circuit board 14, in case the microphone module 22 is held in the connector body 20. These metal strips 92 and 94 are connected to the truck on a substrate 14.

[0034] If assembled, the connector body 20 will be engaged at the lower part edge of a printed circuit board 14. In this location, the base 28 essentially faces with rear-face 14A of a printed circuit board, and, on the other hand, the covering wall 30 faces front 14B. A body is held by the fixed system including **** engaged through a substrate 14 and opening 42.

[0035] In this location, an end wall 31 is arranged in that continuation along with the width of face of a substrate. Therefore, an end wall 31 extends along with the thickness of a substrate, and follows the either side of latter.

[0036] With the resiliency of the proper of the edge of a conductive element 34, they are held at the condition of having contacted the metal strip 38 on rear-face 14A of a printed circuit board. As shown in drawing 1 , the metal strips 92 and 94 produced on top-face 14B of a printed circuit board appear in the bottom of housing 24. The microphone module 22 engages with the hold housing 24, and is held by flexible engagement of the projections 82 and 83 in opening 64 and a notch 62 there.

[0037] In this location, as shown in drawing 3 , the edge of the electric conduction branch 90 brings about electrical installation among these metal strips 92 and 94 by which it is pushed against the metal strips 92 and 94, therefore these very thing is connected with a microphone 70 on the truck on a substrate 14.

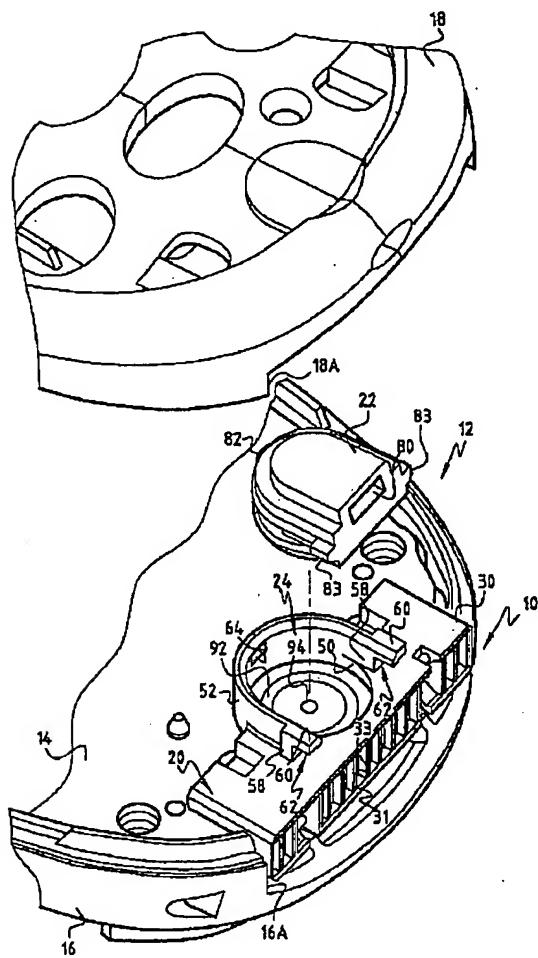
[0038] If the microphone module 22 is held in the connector body 20, the extension 81 of the direction of a path will be the location where opening 80 appears in the direction which opening 34 opened, and will be forced on the top face of the covering wall 30.

[0039] If casing of telephone is assembled, the opening 80 of a connector will align with the sound path hole 19 made by the lower part edge of the front half shell 18.

[0040] If the half shell 16 and 18 is assembled near the substrate 14 supporting a connector 10, an end wall 31 will be held between the discontinuity 16A and 16B made by the lower part edge of half shell. Therefore, an end wall appears through discontinuity. The conductive element 34 which forms an electrical connection terminal counters with the lower part end face of telephone. Therefore, a conductive element 34 can be accessed through discontinuity from the lower part edge of telephone.

[0041] If the conductive element 34 of a connector contacts one of the fields of a printed circuit board using the above connectors, while the microphone module 22 faces the opposed face of a substrate, and it extends and the connection terminal of the microphone module 22 interacts with this opposed face of a substrate, it will be accepted to be the dimension of the longitudinal direction of a connector that follow and the volume is reduced. Therefore, the telephone which incorporates such a connector 10 may be miniaturized.

[Translation done.]

Drawing selection **drawing 1** 

[Translation done.]